

# CAZy - Carbohydrate-Active enZYmes

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**Family GH48**

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**CAZy Family** Glycoside Hydrolase Family 48  
**Known Activities** endoglucanase (EC 3.2.1.4); cellobiohydrolase (EC 3.2.1.91).  
**Mechanism** Inverting  
**Catalytic Nucleophile/Base** Not known  
**Catalytic Proton Donor** Glu  
**3D Structure Status** Available (see PDB). Fold ( $\alpha/\alpha$ )<sub>6</sub>  
**Clan** GH-M  
**Note** formerly known as cellulase family L.  
**Relevant Links** HOMSTRAD; InterPro; PFAM; PRINTS  
**Statistics** CAZy(21); GenBank/GenPept (30); Swissprot (14); PDB (10); 3D(2)

| Protein                                   | Organism   | EC#                 | GenBank / GenPept                                   | SwissProt     | PDB / 3D   |
|---|--|---------------------|---|---------------|--|
| cellulase CelA                            | <i>Anaerocellum thermophilum</i>                   | 3.2.1.91<br>3.2.1.4 | Z86105 <b>CAB06786.1</b>                            | P96311        |  |
| BLi01881 or BL01231                       | <i>Bacillus licheniformis</i> DSM 13<br>ATCC 14580 | n.d.                | CP000002 AAU23416.1<br>AE017333 <b>AAU40776.1</b>   |               |  |
| CelC (fragment)                           | <i>Bacillus licheniformis</i> MD1                  | n.d.                | AJ786638 <b>CAH10343.1</b>                          |               |  |
| processive glycoside hydrolase Cel48A     | <i>Cel48A Bacteroides cellulosolvens</i>           | n.d.                | AY374129 <b>AAR23324.1</b>                          |               |  |
| CelA                                      | <i>Caldicellulosiruptor saccharolyticus</i>        | 3.2.1.4             | M36063 AAA72860.1<br>L32742 <b>AAA91086.1</b>       | P22534        |  |
| cellobiohydrolase B                       | <i>Cel48A Cellulomonas fimi</i>                    | 3.2.1.91            | L29042 AAA50257.1<br>L38827 <b>AAB00822.1</b>       | P50899        |  |
| CelF (CAC0911)                            | <i>Clostridium acetobutylicum</i><br>ATCC 824      | n.d.                | AE007607 <b>AAK78887.1</b><br>NC_003030 NP_347547.1 | Q97KK7        |  |
| CelF                                      | <i>Cel48A Clostridium cellulolyticum</i>           | 3.2.1.4<br>3.2.1.91 | M87018 AAA73866.1<br>U30321 <b>AAB41452.1</b>       | P37698        | 1F9D A<br>1F9O A<br>1FAE A<br>1FBO A<br>1FBW A<br>1FCE _<br>1G9G A<br>1G9J A |
| exoglucanase S (ExgS)                     | <i>Clostridium cellulovorans</i>                   | 3.2.1.91            | U34793 AAC38571.2                                   | <b>O65986</b> |  |
| CelD                                      | <i>Clostridium josui</i>                           | n.d.                | AB004845 <b>BAA32430.1</b>                          | O82831        |  |
| cellobiohydrolase Y (avicelase II) (CelY) | <i>Clostridium stercorarium</i>                    | 3.2.1.91            | Z69359 <b>CAA93280.1</b>                            | P50900        |  |
| CelS                                      | <i>Cel48A Clostridium thermocellum</i>             | n.d.                | L06942 <b>AAA23226.1</b>                            | P38686        | 1L1Y D<br>1L2A E   |
| 1,4- $\beta$ -glucanase (CelY)            | <i>Clostridium thermocellum</i> F7                 | n.d.                | AJ863163 <b>CAI06105.1</b>                          |               |  |
| cellulose 1,4- $\beta$ -                  | <i>Otiorthynchus sulcatus</i>                      | 3.2.1.91            | AJ829763 <b>CAH25542.1</b>                          |               |  |

|                                     |               |   |          |  |        |
|-------------------------------------|---------------|---|----------|--|--------|
| cellobiosidase (Cbh1)               |               |   |          | AJ829764 CAH25543.1                          |        |
| cellobiohydrolase Cel48C            | <i>Cel48C</i> | <i>Paenibacillus barcinonensis</i>      | 3.2.1.91 | AJ488933 CAD32945.1                          | Q8KKF7 |
| cellulase Cel48A                    | <i>Cel48A</i> | <i>Piromyces equi</i>                   | n.d.     | AF449413 AAN76735.1                          | Q8J1E2 |
| cellulase Cel48A                    | <i>Cel48A</i> | <i>Piromyces</i> sp. E2                 | n.d.     | AF449412 AAN76734.1                          | Q8J1E3 |
| cellulase Cel48A                    | <i>Cel48A</i> | <i>Ruminococcus albus</i> 8             | n.d.     | AY422811 AAR01217.1                          |        |
| SAV1855 (GuxA3)                     |               | <i>Streptomyces avermitilis</i> MA-4680 | n.d.     | AP005028 BAC69566.1<br>NC_003155 NP_823031.1 |        |
| SCO6546 or SC5C7.31c                |               | <i>Streptomyces coelicolor</i> A3 (2)   | n.d.     | AL031515 CAA20643.1<br>NC_003888 NP_630627.1 | O86728 |
| exocellulase E6<br>(CelF; Tfu_1959) | <i>Cel48A</i> | <i>Thermobifida fusca</i> YX            | 3.2.1.91 | AF144563 AAD39947.1<br>CP000088 AAZ55992.1   | Q9XCD4 |

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